Designated Critical Habitat by PBF Element	Physical or Biological Subfactor
Springs, Seeps, Groundwater	Water quality and quantity
	Thermal refugia
Migratory Habitats	Water quality impediments Permanent, partial, intermittent or seasonal barriers Biological impediments
Abundant Food Base	Macroinvertebrates and fish
Complex Habitats	LWD, side channels, pools, undercut banks, unembedded substrates Variety of depths, gradient, velocities and structure
Water Temperature	Water temperature range
	Diurnal and seasonal variation - shading, streamflow, and local groundwater influence
Substrate	Amount and size of substrate

Key Physical and Biological Factors (PBF) and Pathways Relationships fo

Definition of Physical and Biological Factors (PBF) from Code of Federal Regulations (75 CFR 63898)	Relevant Species Life State
Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia. and provide thermal refugia.	All life stages
Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.	Spawning, rearing and overwintering
An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	All life stages
Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.	
Water temperatures ranging from 2 to 15 degrees Celsius (°C) (36 to 59 degrees Fahrenheit (°F)), with adequate thermal refugia available for temperatures that exceed the upper end of this range.	Requirements vary based on life stage
Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.	
In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.	

r Bull Trout and Designated Critical Habitat

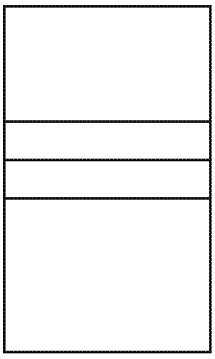
Associated WCIs (Crosswalk; Kruskal et al. 2011)	Potential Project Effects
Temperature, sediment, nutrients, chemical contamination, embeddedness, off-channel habitat, refugia, streambank condition, floodplain connectivity, changes in peak/base flows, drainage network increase, road density and location, disturbance history, riparian conservation areas	Tailings storage facility and development rock facility
Temperature, sediment, nutrients, chemical contamination, physical barriers, embeddedness, refugia, wetted width/max depth ratio, changes in peak/base flows	Short-term change in migration corridor associated with temporary installation of EFSFSR diversion tunnel
	Long-term change in migration corridor associated with stream channel rehabilitation across the YPP
	Long-term change in migration corridor associated with the development of the tailing storage facility
Sediment, nutrients, chemical contamination, embeddedness, LWD, pool frequency and quality, off-channel habitat, refugia, streambank condition, floodplain connectivity, riparian conservation areas	Low flow diversion pipes
Sediment, embeddedness, LWD, pool frequency and quality, large pools, off-channel habitat, refugia, wetted width/max depth ratio, streambank condition, floodplain connectivity, road density and location, riparian conservation areas, disturbance regime	Change in habitat complexity associated with loss of YPP and stream channel
	Change in habitat complexity associated with stream channel rehabitation across YPP
Temperature, large pools, off-channel habitat, refugia, wetted width/max depth ratio, streambank condition, floodplain connectivity, changes in peak/base flows, drainage network increase, road density and location, disturbance history, riparian conservation areas,	
Sediment, embeddedness, refugia, streambank condition, floodplain connectivity, drainage network increase, road density and location, riparian conservation areas, disturbance regime	Low flow diversion pipes

Effects Analysis

Natural Hydrograph	Mimic base and high/seasonal natural flows
Water Quality/Quantity	Sufficient water quality
	Sufficient water quantity
Nonnative Species	Low level of nonnative predation, competition, interbreeding

A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.	All life stages
Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	
Sufficiently low levels of occurrence of nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.	Spawning and adult life stages

Refugia, streambank condition, floodplain connectivity, drainage network increase, road density and location, disturbance history, riparian conservation areas	
Temperature, nutrients, chemical contamination, refugia, wetted width/max depth ratio, streambank condition,	
Temperature, refugia	



Key Biological and Physica

Category	Physical or Biolgocial Factor
Freshwater Spawning Sites	Water Quality, water quantity, and substrate
Freshwater Rearing Sites	Water quantity and floodplain connectivity to form and maintain physical habitat condition
	Water quality and forage
	Natural Cover
Freshwater Migration Corridors	Free of artificial obstructions, water quality and quantity, and natural cover
Spawning and Juvenile Rearing	Spawngin gravel, water qualtiy and quantity, cover/shelter, food, reparian vegetation, and space
Migration	Substrate, water quality and quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, safe passage

ıl Factors and Pathways Relationships for Chinook Salmon and Steelhead and Designated Criti

Factor Definition
Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development. These features are essential to conservation because without them the species cannot successfully spawn and produce offspring.
Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks. These features are essential to conservation because without them juveniles cannot access and use the areas needed to forage, grow, and develop behaviors (e.g., predator avoidance, competition) that help ensure their survival.
Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival. These features are essential to conservation because without them juveniles cannot use the variety of habitats that allow them to avoid high flows, avoid predators, successfully compete, begin the behavioral and physiological changes needed for life in the ocean, and reach the ocean in a timely manner. Similarly, these features are essential for adults because they allow fish in a non- feeding condition to successfully swim upstream, avoid predators, and reach spawning areas on limited energy stores.
Snake Rive
Estuarine areas free of obstruction with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh-and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation. These features are essential to conservation because without them juveniles cannot reach the ocean in a timely manner and use the variety of habitats that allow them to avoid predators, compete successfully, and complete the behavioral and physiological changes needed for life in the
Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels. As in the case with freshwater migration corridors and estuarine areas, nearshore marine features are essential to conservation because without them juveniles cannosuccessfully transition from natal streams to offshore marine areas. We have focused our designation on

:al Habitat

Relevant Species Life State	Associated WCIs
Snake River Steehead	
Spawning, incubation, and larval development	
Juvenile growth and mobility	
Juvenile development	
Juvenile mobility and survival	
Juvenile and adult mobility	
r Spring/summer Chinook Salmon	
Spawning and juvenile	
Juvenile and adult	

Potential Project Effects	Effects Evaluation Needs
Change in habitat complexity associated with loss of YPP and stream channel	
Change in habitat complexity associated with stream channel rehabitation across YPP	
Low flow diversion pipes	
Change in habitat complexity associated with loss of YPP and stream channel	
Change in habitat complexity associated with stream channel rehabitation across YPP	
Low flow diversion pipes	
Short-term change in migration corridor associated with temporary installation of EFSFSR diversion tunnel	
Long-term change in migration corridor associated with stream channel rehabilitation across the YPP	
Long-term change in migration corridor associated with the development of the tailing storage facility	
Long-term change in migration corridor associated with removal or restoration of box culvert bridge.	
Short-term change in migration corridor associated with temporary installation of EFSFSR diversion tunnel	
Long-term change in migration corridor associated with stream channel rehabilitation across the YPP	
Long-term change in migration corridor associated with the development of the tailing storage facility	
Long-term change in migration corridor associated with removal or restoration of box culvert bridge.	
Short-term change in migration corridor associated with temporary installation of EFSFSR diversion tunnel, New TSF barrier on Meadow Creek	